

SOME PYRENOCARPOUS LICHENS FROM MACQUARIE ISLAND

by

P. M. MCCARTHY*

ABSTRACT

McCarthy, P.M. Some pyrenocarpous lichens from Macquarie Island. *Muelleria* 7(3): 343–347 (1991). — Five saxicolous pyrenocarpous lichens are reported from Macquarie Island. *Verrucaria bubalina* McCarthy *sp. nov.* is described.

INTRODUCTION

Macquarie Island is situated in the Southern Ocean between New Zealand and Antarctica. Until comparatively recently little published information concerning its lichen flora had been made available. Small collections made during the British, Australian and New Zealand Antarctic Research Expedition (B.A.N.Z.A.R.E.) of 1929–1931 and in the decade following the establishment of the Australian National Antarctic Research Expedition station in 1948 were sent to C. W. Dodge who described 25 new taxa (Dodge 1948, 1968, 1970, Dodge & Rudolph 1955).

The period 1963–1972 saw a more intensive investigation of the lichen flora, mainly through the efforts of R. B. Filson, K. S. Simpson, R. J. Hnatiuk and R. Waterhouse (Filson 1981). Subsequently, Filson provided accounts of some of the more important macrolichen genera on the island (Filson 1981a, 1986, Filson & Archer 1986). The National Herbarium of Victoria houses the bulk of these later collections.

Little is known of the pyrenocarp flora of Macquarie Island. Dodge's papers includes 5 newly described taxa, viz. *Arthopyrenia macquariensis*, *Mastodea macquariensis*, *Microthelia macquariensis*, *Phyllopyrenia macquariensis* and *Porina macquariensis*. The maritime lichen *Verrucaria subdiscreta* McCarthy has since been observed among the MEL collections (McCarthy 1991), as has *Thelenella mawsonii* Mayrh. & McCarthy (Mayrhofer & McCarthy 1991).

Pyrenocarpous lichens are well represented among the Macquarie Island collections in MEL. Five taxa, all of which are reported from Macquarie Island for the first time, are enumerated below. Further *Verrucariae* await identification as do at least four species of *Porina* Müll. Arg.

TAXONOMY

1. *Thelidium praevalescens* (Nyl.) Zahlbr., *Deutsche Sudpolar Exp., 1901–1903* 8: 51 (1906) — *Verrucaria praevalescens* Nyl. in Crombie, *J. Linn. Soc., Bot.* 15: 192 (1876).

The silicolous *Thelidium praevalescens* was first collected on Kerguelen Island in the South Indian Ocean and has since been found on nearby Heard Island (Dodge 1948). The thalli of the Macquarie Island specimens are pale yellow-brown to olive brown, rimose to sparingly areolate and up to 0.1 mm in thickness. Most perithecia are semi-immersed in the thallus and have a thick 0.3–0.6 mm diameter involucrellum that is often almost entirely covered by the thallus. The colourless 3-septate spores measure $35\text{--}55 \times 14\text{--}22 \mu\text{m}$.

* National Herbarium of Victoria, Birdwood Avenue, South Yarra, Victoria, Australia 3141.

SPECIMENS EXAMINED:

Macquarie Island — half way along E shore of Lake Flynn, on gabbro, alt. 180 m, 3.ii.1964, R.B. Filson 5895, 5896 & J. Phillips (MEL); south shore of Lake Flynn, on gabbro, 3.ii.1964, R.B. Filson (5901) & J. Phillips (MEL).

2. *Verrucaria bubalina* McCarthy, *sp. nov.*

Thallus crustaceus, epilithicus, praecipue bubalinus, aliter subgriseo-fuscum vel griseo-viridis, hebetatus, laevigatus, rimosus, 0.05–0.15(–0.3) mm crassus, strato basali fusco vel fuscoatro, saepe discontinuo, 0.02–0.06(–0.15) mm crasso; margo diffusus, pallido-bubalinus; thallus tectus ab strato necrali hyalino, 5–15 μ m crasso. *Cortex* fuscus, male limitatus, 5–10 μ m crassus. *Stratum algarum* diffusum, 0.5–0.1 mm crassum; cellulae virides, latae-ellipsoideae vel globosae, 5–11 \times 5–9 μ m. *Hyphae* arcte contiguae, parietibus tenuibus, 3–5 μ m diametro. *Perithecia* atra vel fusco-atra, composita, semiimmersa vel fere omnino immersa, numerosa, plerumque solitaria. *Ostiolum* inconspicuum vel leviter depressum, plerumque griseo-fuscum. *Involucrellum* apicale vel dimidiatum vel subintegrum, cum excipulo contiguum, 0.25–0.5 mm diametro, 0.06–0.08(–0.12) mm crassum, extra aliquando laevigatum, plerumque cum 12–20 jugis carbonaceis, inconspicuis vel prominentibus, ex ostiolo radiatis. *Apex ascomatis* plerumque moderate complanatus. *Centrum* globosum, 0.2–0.35 mm diametro. *Excipulum* fuscum vel fusco-atrum, 20–35 μ m crassum. *Periphyses* 30–40 \times 1.5–2 μ m. *Paraphyses* evanescentes. *Asci* bitunicati, clavati, 8-sporei, 55–67 \times 18–25 μ m. *Gelatinum hymenii* J+ vinaceum. *Ascospores* simplices, incoloratae, longae-ellipsoideae, (14.7–)18.9(–23.5) \times (6.8–)8.8(–11.2) μ m, contento subtiliter granuloso.

HOLOTYPE: Macquarie Island, Hasselborough Bay beach, on basalt “in an exposed situation”, 10.iv.1972, R. Waterhouse A59 (MEL 1020945).

Thallus crustose, epilithic, usually buff-brown, otherwise grey-brown or grey-green, matt, smooth, rimose, 0.05–0.15(–0.3) mm thick, with a brown to brown-black, 0.02–0.06(–0.15) mm thick basal layer that is often discontinuous; margin diffuse; the thallus is covered by a hyaline necral layer, 5–15 μ m thick. *Cortex* brown, poorly-defined, 5–10 μ m thick. *Algal layer* diffuse, 0.5–0.1 mm thick; cells broadly-ellipsoid to globose, 5–11 \times 5–9 μ m. *Hyphae* densely-packed, thin-walled, 3–5 μ m diam. *Perithecia* compound, semi-immersed to almost entirely immersed, numerous, mostly solitary. *Ostiole* inconspicuous or slightly depressed. *Involucrellum* ranging from a thickening about the uppermost third of the perithecium, to dimidiate, to almost subentire, contiguous with the excipulum, 0.25–0.5 mm diam., 0.06–0.08(–0.12) mm thick, externally occasionally smooth or with 12–20 faint to pronounced carbonaceous ridges radiating from the ostiole. The perithecial apex is usually somewhat flattened, frequently grey-brown around the ostiole. *Centrum* globose, 0.2–0.35 mm diam. *Excipulum* brown to brown-black, 20–35 μ m thick. *Periphyses* 30–40 \times 1.5–2 μ m. *Paraphyses* evanescent. *Asci* bitunicate, clavate, 8-spored, 55–67 \times 18–25 μ m. *Hymenial gel* and ascoplasma I+ deep wine-red. *Ascospores* (14.7–)18.9(–23.5) \times (6.8–)8.8(–11.2) μ m (70 individuals measured); contents finely granular. (Fig. 1)

DISCUSSION:

Verrucaria bubalina is a maritime lichen of hard siliceous rocks. The three specimens were found at altitudes ranging from sea-level to almost 200 m; they were associated with *Verrucaria maura*, *V. durietzi*, *Pertusaria* sp., an indeterminate moss and a species of the green alga *Prasiola*.

Morphological variability among the specimens examined is most clearly seen in the surface features, thickness and downward penetration of the involucrellum and in the thickness of the hypothallus. The surface of the involucrellum ranges from a dull dark brown to glossy black, from smooth to radially ridged (Fig. 2A, B). In vertical section its penetration is seen to reflect the degree of immersion of the perithecium. The hypothallus rarely develops as a distinct layer within several millimetres of the thallus margin; under older areolae, its thickness and degree of carbonisation may vary dramatically, even between adjacent areolae.

Verrucaria bubalina is distinguishable from other buff-brown epilithic Verrucariae in the supralittoral of the Antarctic and Subantarctic regions by its

thallus, its moderately large perithecia with a dark excipulum and by the dimensions of its ascospores. Thus, *V. durietzii* Lamb has a lobate thallus margin, a persistently thicker hypothallus, smaller perithecia and smaller ascospores; *Verrucaria tessellatula* Nyl. has black-walled rimae and very much smaller perithecia and ascospores; *V. elaeoplaca* Vainio possesses a verrucose-areolate thallus and smaller perithecia with a colourless excipulum. Two species from Kerguelen Island deserve mention:

V. mawsonii Dodge features larger perithecia, a colourless excipulum, ascospores of $15-18\ \mu\text{m}$ in length and a black-punctulate thallus (Dodge 1948); *V. werthii* Dodge has a thin tartareous thallus, superficial perithecia and ascospores of $12-15 \times 7-8\ \mu\text{m}$ (Dodge 1948).

OTHER SPECIMENS EXAMINED:

Macquarie Island — Lusitania Bay, "rocky (basalt) outcrop on (the) beach", 10.ii.1964, *R.B. Filson* (5976) & *P. Atkinson* (MEL); Caroline Cove, on basalt, centre of penguin colony, alt. 600 feet, *K. Simpson* E53 (MEL 1000277).

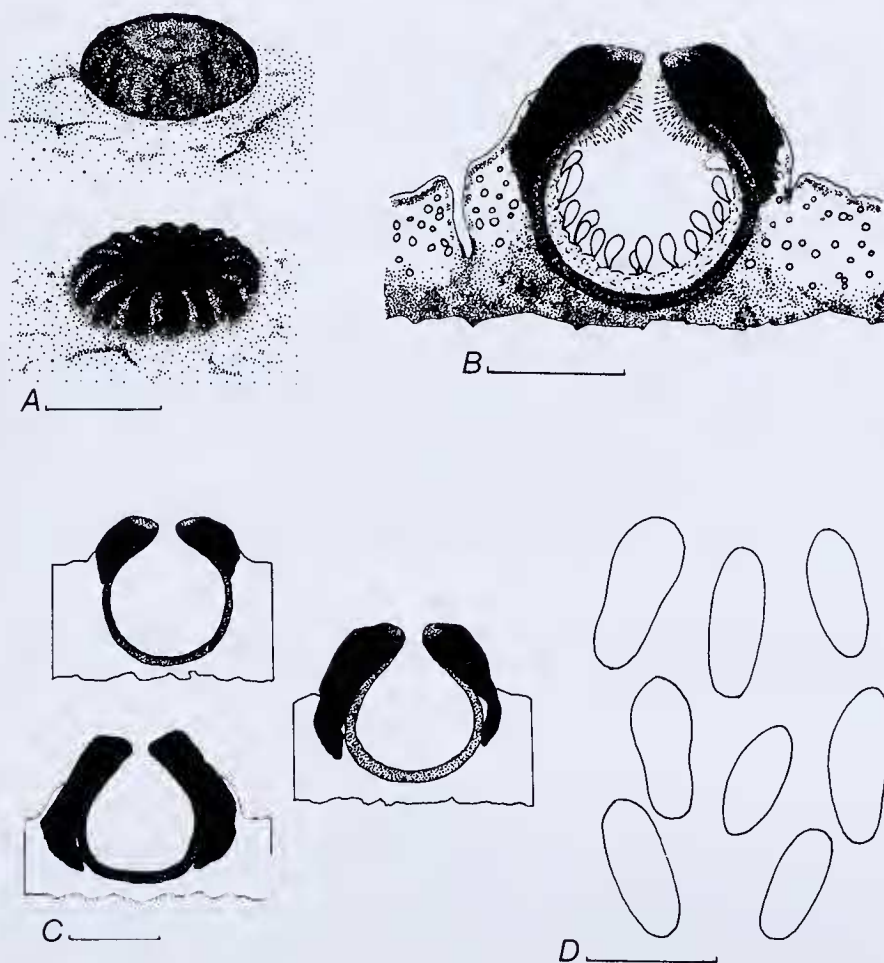


Fig. 1. *Verrucaria bubalina*. A — oblique views of perithecial apices showing smooth and radially ribbed forms; scale 0.2 mm. B — vertical section of perithecium and thallus; scale 0.2 mm. C — vertical sections of perithecia exhibiting variously developed involucrella; scale 0.2 mm. D — ascospores; scale $20\ \mu\text{m}$.

3. *Verrucaria durietzii* Lamb, *Lilloa* 14: 205 (1948).

Verrucaria durietzii is one of the most distinctive members of a complex and complicated genus. The pale buff-brown to dark brown thallus together with its exceptionally well-developed carbonaceous hypothallus may be up to 2 mm thick. Forming large continuous colonies, it is distinctly lobate at the margin and deeply areolate nearer the centre. The black 0.15–0.3 mm wide perithecia are semi-immersed to almost entirely immersed and have a generally poorly-developed apical to dimidiate involucrellum. The ascospores are $12\text{--}17 \times 7\text{--}11 \mu\text{m}$.

This maritime silicolous lichen is already known from New Zealand and the Auckland Islands (Lamb 1948). Twenty-one Macquarie Island specimens have been seen; they were collected at 13 localities at altitudes of up to almost 200 m.

SELECTED SPECIMENS EXAMINED:

Macquarie Island — below summit of Brothers Point, on basalt “at water’s edge”, 14.viii.1965, K. Simpson A72 (MEL 1000413); Caroline Cove, on rock in centre of penguin colony, alt. 600 feet, 18.i.1966, K. Simpson E52 (MEL 1000284); Upper Nuggets Valley, on rock, 30–50 feet above sea-level, 21.i.1972, R. Hnatiuk 11800 (MEL 1027297).

4. *Verrucaria maura* Wahlenb., in Ach., *Meth. Lich.*: 19 (1803).

This cosmopolitan species of the upper littoral and supralittoral on rocky seashores is represented in 31 collections at MEL. It was found at 16 localities at up to 15 m above sea-level.

SELECTED SPECIMENS EXAMINED:

Macquarie Island — 1/2 mile S of Douglas Pt, alt. 6 feet, 9.xi.1966, K. Simpson E24 (MEL 100419); The Brothers, alt. 10–20 feet, 8.i.1972, R. Hnatiuk 11696 (MEL 1027206); W of Aurora Cave, 21.i.1972, R. Hnatiuk 11810 (MEL 1027273).

5. *Verrucaria tessellatula* Nyl., in Crombie, *J. Bot., Lond.* 13: 335 (1875).

First collected on Kerguelen Island in 1874–75 by E. A. Eaton during the Transit of Venus Expedition, *V. tessellatula* has since been seen on Tierra del Fuego, the Falkland Islands (islas Malvinas), South Georgia and on the South Shetland and South Orkney Groups (Redon 1985). Two Macquarie Island specimens of this supralittoral lichen have been seen.

Verrucaria tessellatula has a pale buff-brown rimose to areolate thallus with black-walled rimae. The immersed 0.1–0.2 mm diam. perithecia have a black apical involucrellum, a colourless excipulum and ascospores of $10\text{--}15 \times 7\text{--}9 \mu\text{m}$.

SPECIMENS EXAMINED:

Macquarie Island — half-way between Buckles Bay and Handspike Bay, “just above beach level”, 23.11.1964, J. Phillips (R.B. Filson 6261) (MEL); Hasselborough Bay beach, 10.iv.1972, R. Waterhouse A54 (MEL 1020940).

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